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(54) PRINTER FITTED WITH IMAGE READER.

(57) A printer (1) integrally provided with an image reader having a handy scanner for reading an original and an automatic original carrying device (4) to which the handy scanner is detachably set. The printer (1) is further provided with a mechanism for easily removing jammed originals in the image reader (2). A scanner hopper (31) is so provided in the upper part of the device (4) as to be rotatable around the supporting shaft (32). The front end part (31b) of the scanner hopper (31) is biased upward by a spring (36), and the rear end part (31a) can approach the shaft (27) of a separating roller (9). The handy scanner (3) is fastened on the device (4) by latches (23, 24).

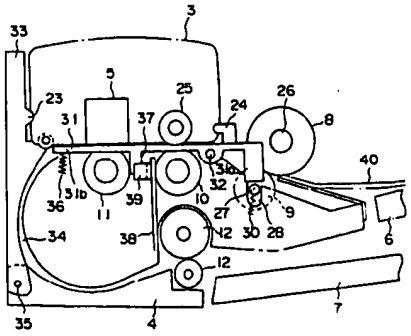

FIG. 4

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TECHNICAL FIELD

The present invention relates to a printer integrally provided with an image reading unit.

BACKGROUND TECHNOLOGY

A handy scanner for manually reading an image information on a draft has conventionally been put to practice, and an image reading unit in which the handy scanner is detachably mounted on an automatic draft feeder is developed.

Such an image reading unit is described in Japanese Patent Laid-Open Publication No. 61 - 184044. This invention enables a handy scanner type image reading unit to also serve as a draft conveying type stationary image reading unit besides as a handy scanner type image reading unit by adding a jig capable of conveying drafts to the handy scanner type image reading unit.

The handy scanner type image reading unit as set forth above, however, requires an additional printing device or needs to be connected to a personal computer so as to perform printing by a printer.

Therefore, an integral type device capable of reading the image information on a draft, printing out the image information on paper etc. is recently looked for. Accordingly, it is the object of the present invention to provide a printer provided integrally with an image reading unit which comprises a handy scanner for reading a draft and an automatic draft feeder on which the handy scanner is detachably mounted for automatically conveying the draft wherein a draft jammed in the image reading unit can be easily removed.

DISCLOSURE OF THE INVENTION

In a printer integrally provided with an image reading unit comprising a handy scanner for reading a draft and an automatic draft feeder which has a paper supply roller and to which the handy scanner is detachably mounted, the printer integrally provided with the image reading unit is characterized in comprising:

a separating member which is pressed against the paper supply roller and is movable toward and away from the paper supply roller;

a turning member for carrying the handy scanner thereon, engaging with the separating member and being turned so as to separate the handy scanner from the automatic draft feeder and the separating member from the paper supply roller when the handy scanner is mounted thereon;

a biasing member for turning the turning member; and

a retaining member for retaining the handy scanner at the position where it is mounted on the automatic draft feeder.

When the retaining member for retaining the handy scanner to the automatic draft feeder is disengaged, the turning member is turned by an urge of the biasing member and is separated from the automatic draft feeder. Whereby the turning member separates the handy scanner from the automatic draft feeder and the separating member from the paper supply roller. As a result, in case that a draft is jammed between the handy scanner and the automatic draft feeder, or between the paper supply roller and the separating member, it can be easily removed.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a printer provided with an image reading unit according to the present invention, Fig. 2 is a perspective view showing the printer provided with the image reading unit in which a scanner cover is open, Fig. 3 is a schematic view of the printer provided with the image reading unit for explaining the function thereof, Fig. 4 is a view for explaining in detail the image reading unit, Fig. 5 is a plan view showing in detail the image reading unit, Fig. 6 is a perspective view provided with the image reading unit and Fig. 7 is a view for explaining in detail the image reading unit.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention will be described in detail with reference to the attached drawings. Elements which are common to the drawings are denoted at the same numerals.

Figs. 1 and 2 are perspective views showing a printer provided with an image reading unit according to the present invention. Fig. 3 is a schematic view for explaining the printer provided with the image reading unit.

In Fig. 3, an image reading unit 2 is provided in the printer 1 integrally therewith. The image reading unit 2 is composed of a handy scanner 3 and an automatic draft feeder 4. The handy scanner 3 is provided with a reading sensor unit 5. The handy scanner 3 is easily detachable from the automatic draft feeder 4. The automatic draft feeder 4 comprises a paper supply tray 6, a paper discharge tray 7, a paper supply roller 8, a separating roller 9, conveying rollers 10 and 11 and a discharge roller 12.

A paper cassette 13 for accommodating printing papers therein is provided under the image reading unit 2 and a paper supply roller 14 is fixed above the tip end portion of the image reading unit

2. an image forming portion 15 is provided substantially at the center of the printer 1, in which each printing process such as light exposure, development, transfer etc. is performed according to an electrophotographic process. A fixing unit 16 is provided on the left of the image forming portion 15. A paper discharging portion 18 for discharging paper 17 after printing is performed thereon is formed in the upper portion of the printer 1. A scanner cover 19 is fixed above the image reading unit 2 turnably about the fulcrum 20 (in the state as illustrated in Fig. 2). The scanner cover 19 covers the upper portion of the image reading unit 2 for preventing obstructive matters from entering the image reading unit 2 when the scanner cover 19 is shut (in the state as illustrated in Fig. 1). Although the scanner cover 19 is opened when the handy scanner 3 is attached to or detached from the printer 1, obstructive matters are prevented from entering the image reading unit 2 by shutting the scanner cover 19 even when the handy scanner 3 is not attached to the printer 1. The upper surface of the scanner cover 19 is continuous to the stacking surface 21 of the paper discharging portion 18 in the upper portion of the printer 1 so the head portion of the paper 17 can be put on the upper surface of the scanner cover 19 when the paper 17 is discharged into the paper discharging portion 18.

As described above, the closable scanner cover 19 having the stacking surface of the printing paper thereon is provided in the printer and the image reading unit 2 including a detachable handy scanner 3 is provided under the scanner cover 19, so that the printer can be made small in size and light in weight.

An operation of reading an image on a draft will be described with reference to Fig. 3 hereinafter. The draft is put on the paper supply tray 6 and fed sheet by sheet by the paper supply roller 8 and the separating roller 9. The fed draft is conveyed to the reading sensor unit 5 by way of the conveying roller 10, where the image information is read as the draft is pressed against the reading sensor unit 5 by the conveying roller 11. The draft is reversed in its conveying direction after reading and is discharged on the paper discharge tray 7 by the discharge roller 12.

When printing is performed on the paper, the paper supply roller 14 is rotated in response to the instruction from a high-ranking device, not shown, so as to feed the paper sheet by sheet from the paper cassette 13. The fed paper is conveyed to the image forming portion 15 by a conveying roller 20a, where the image is transferred thereon under the electrophotographic process according to an image information supplied from a high-ranking device, not shown. The image transferred onto the paper is fixed in a fixing unit 16, and thereafter the paper 17 is discharged into the paper discharging portion 18 by a conveying roller 20b and a discharging roller 22.

The image reading unit 2 will be further described in detail.

Fig. 4 is a view for explaining the image reading unit in detail and Fig. 5 is a plan view showing the image reading unit in detail. In the figures, the handy scanner 3 is fixedly positioned to the automatic draft feeder 4 by latches 23 and 24. The handy scanner 3 is provided with a sensor unit for reading images in the draft and a guide roller 25 therein. A paper supply roller 8 for feeding drafts is rotatably fixed to the automatic draft feeder 4 by way of a shaft 26, and a separating roller 9 is rotatably fixed to the automatic draft feeder 4 diagonally to the lower position of the paper supply roller 8 by way of a shaft 27. The shaft 27 is movable along a long groove 28 as illustrated in Fig. 4. The long groove 28 is formed in the frame 29 as illustrated in Fig. 5. An end of a spring 30 engages the shaft 27 so as to press the separating roller 9 against the paper supply roller 8 by its resilience.

A scanner hopper 31 is fixed in the upper portion of the automatic draft feeder 4 in such a way as to be turnable about a supporting shaft 32. The scanner hopper 31 is attached to the automatic draft feeder 4 at the both end portions thereof, and the handy scanner 3 is mounted on the scanner hopper 31 and is fixedly positioned thereto by left and right latches 23 and 24. The latch 23 is formed on a conveying guide 33. The conveying guide 33 forming the outer side of a conveying direction reversing route 34 of the automatic draft feeder 4 extends to the position where the handy scanner 3 is fixed to the automatic draft feeder 4 and is turnable about a fulcrum 35.

The scanner hopper 31 has substantially an L shape as illustrated in Fig. 4, and is positioned close to the upper portion of the shaft 27 of the separating roller 9 at the rear end portion 31a thereof. A spring 36 is provided under the front end portion 31b of the scanner hopper 31 for biasing the front end portion 31b upward. A shading plate 37 is integrally formed with the scanner hopper 31. The automatic draft feeder 4 comprises a printed circuit board 38, on which a photosensor 39 composed of a light-emitting and a light-receiving elements is mounted. Accordingly, the shading plate 37 enters between the light-emitting and light-receiving elements of the photosensor 39 when the handy scanner 3 is attached to the image reading unit 2 as illustrated in Fig. 4 so as to intercept the light path. Whereby the handy scanner 3 is detected as it is mounted on the image reading unit 2.

The reading operation of this embodiment is performed as follows.

Referring to Fig. 4, at first a draft 40 on the paper supply tray 6 is drawn out by the clockwise rotation of the paper supply roller 8 and is separated sheet by sheet by the separating roller 9 pressingly contacting the draft 40. Thereafter, the draft 40 is conveyed as it is clamped by the conveying roller 10 and the guide roller 25, and is further conveyed to the portion under the reading sensor unit 5 by way of the conveying roller 11, where the reading sensor unit 5 reads the image information on the draft 40. After the completion of reading, the draft 40 enters the conveying direction reversing route 34 thereby to be reversed in conveying direction and is discharged on the paper discharge tray 7 by way of the discharge roller 12.

When the draft 40 is jammed in transit, at first the upper cover 42 containing the printing unit 42 therein is opened as illustrated in Fig. 6. Thereafter the conveying guide 33 is turned in the direction of the arrow B as illustrated in Fig. 7, so that the latch 23 comes off the handy scanner 3. Whereby the scanner hopper 31 is turned clockwise about the supporting shaft 32 with the handy scanner 3 mounted thereon as it is pressed upward by the spring 36. The handy scanner 3 is also turned clockwise about the latch 24, so that a gap is formed between the handy scanner 3 and the automatic draft feeder 4 and the conveying rollers 10 and 11 are disengaged from the guide roller 25 and the reading sensor unit 5 respectively. As a result, the draft 40 jammed between the handy scanner 3 and the automatic draft feeder 4 can be easily removed. Furthermore, the draft 40 jammed in the conveying direction reversing route 34 can be also removed with ease by opening the conveying guide 33 in the direction of the arrow B.

Still furthermore, the rear end portion 31a of the scanner hopper 31 contacts the shaft 27 thereby pressing down the same against the pressure of the spring 30 by the clockwise turning of the scanner hopper 31. As a result, the separating roller 9 is separated from the paper supply roller 8 as illustrated in Fig. 7. Accordingly, in case that the draft 40 is jammed between the separating roller 9 and the paper supply roller 8, it can be easily removed.

INDUSTRIAL UTILIZATION

As described above, the present invention is adapted for removing a draft jammed in the image reading unit of a printer provided therewith.

Claims

1. In a printer integrally provided with an image reading unit comprising a handy scanner for reading a draft and an automatic draft feeder which has a paper supply roller and to which the handy scanner is detachably mounted, said printer integrally provided with the image reading unit is characterized in comprising:

   a separating member which is pressed against said paper supply roller and is movable toward and away from said paper supply roller;

   a turning member for carrying said handy scanner thereon, engaging with said separating member and being turned so as to separate said handy scanner from said automatic draft feeder and said separating member from said paper supply roller when said handy scanner is mounted thereon;

   a biasing member for turning said turning member; and

   a retaining member for retaining said handy scanner at the position where it is mounted on the automatic draft feeder.

2. In a printer integrally provided with an image reading unit comprising a handy scanner for reading a draft and an automatic draft feeder which has a paper supply roller and a conveying direction reversing route for reversing the conveying direction of said draft and on which said handy scanner is detachably mounted, said printer integrally provided with said image reading unit is characterized in comprising:

   a retaining member for retaining said handy scanner on said automatic draft feeder; and

   a guide member turnably provided for forming a curved outer portion of said conveying direction reversing route.

3. In a printer provided with an image reading unit comprising a handy scanner for reading a draft and an automatic draft feeder on which said handy scanner is detachably mounted from the upper side thereof and a paper discharging portion provided at the upper portion thereof for discharging the printed paper,

   said printer integrally provided with said image reading unit is characterized in further comprising:

   a closable cover mounted on said printer for covering said handy scanner therein and

   the upper surface of said cover forms a part of said paper discharging portion when said cover is closed.

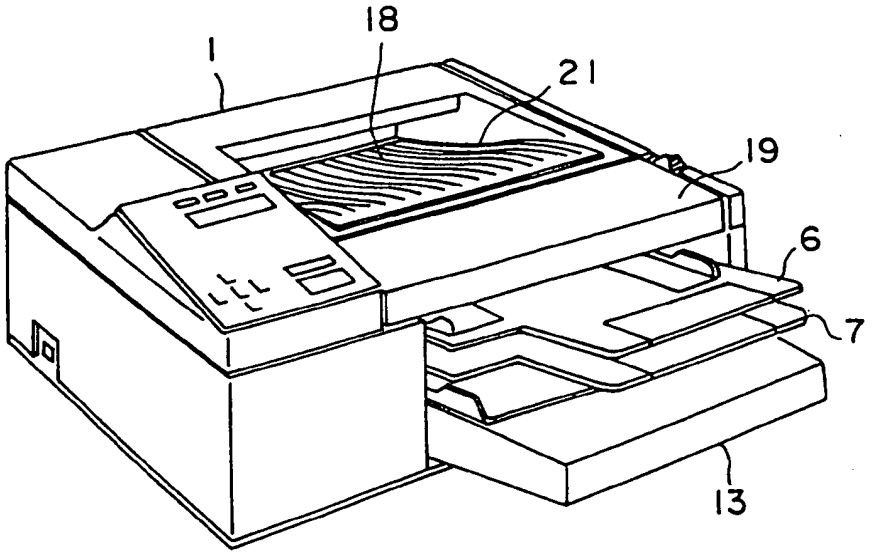

FIG. 1

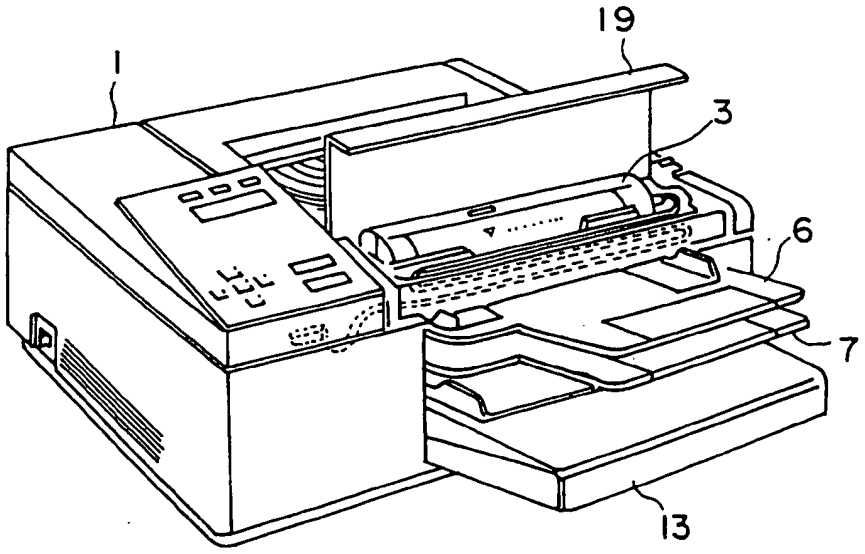

FIG. 2

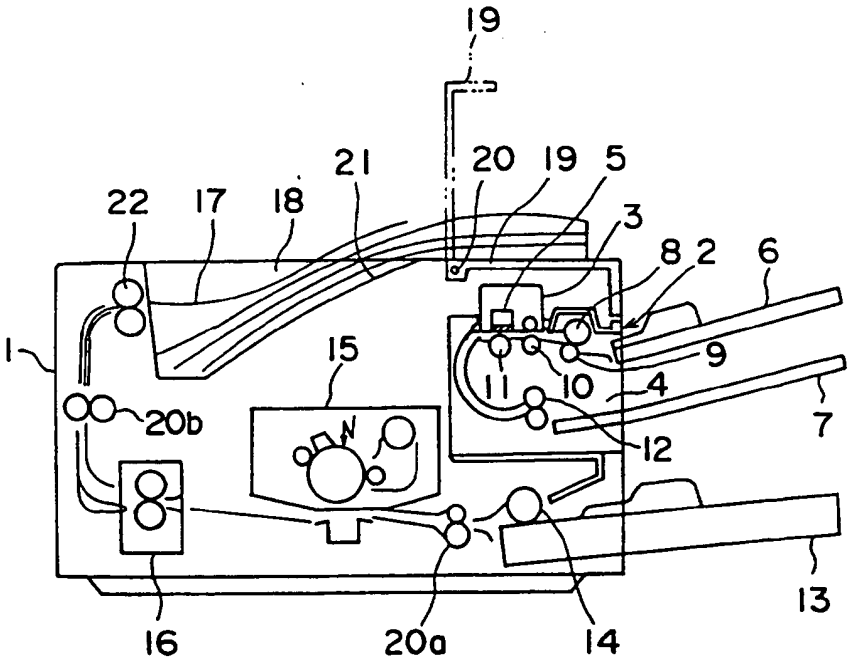

FIG. 3

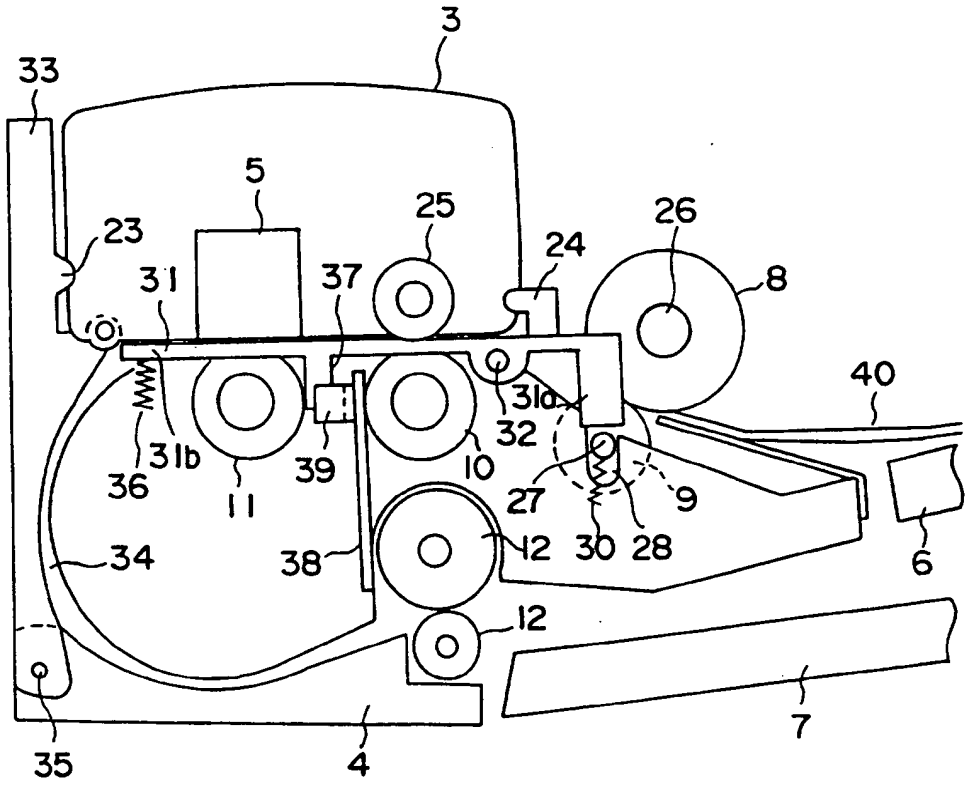
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FIG. 4

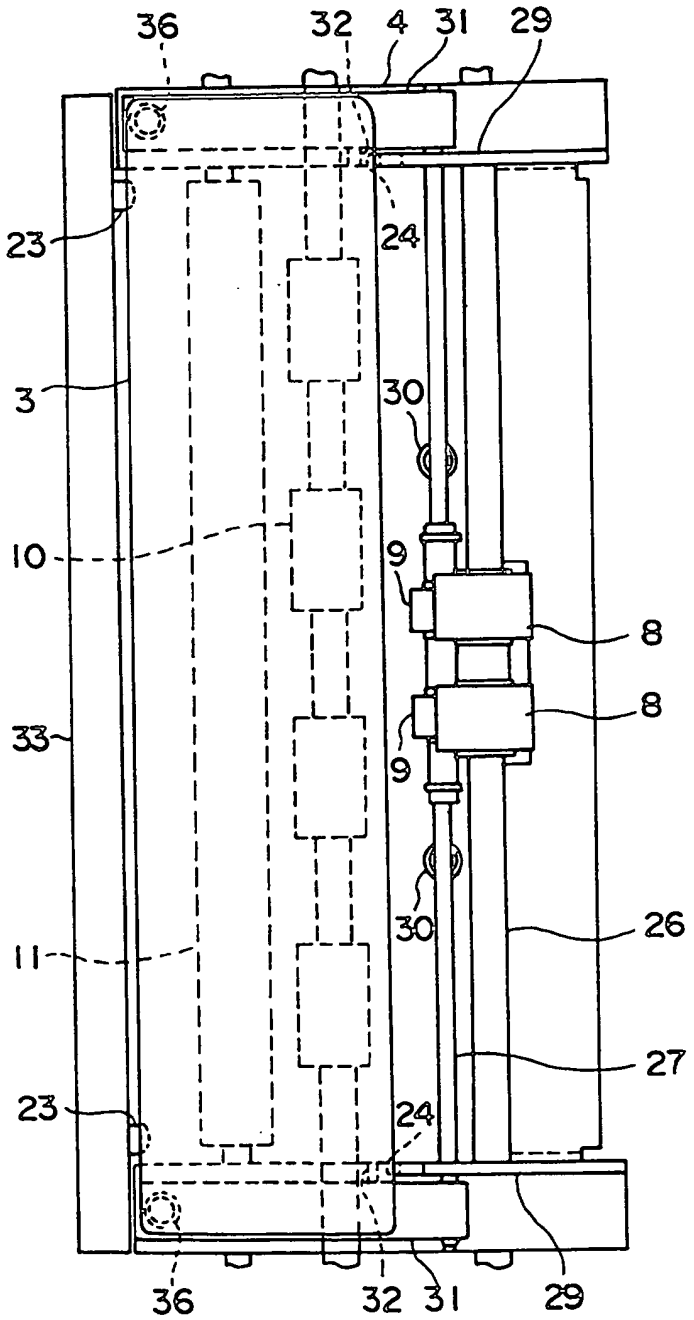

FIG. 5

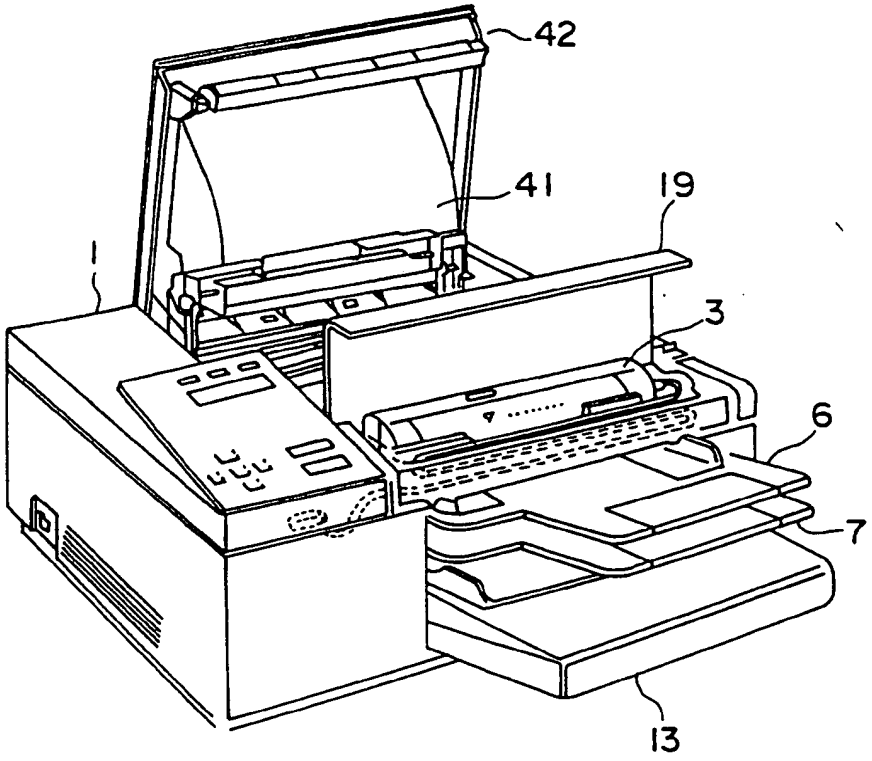

FIG. 6

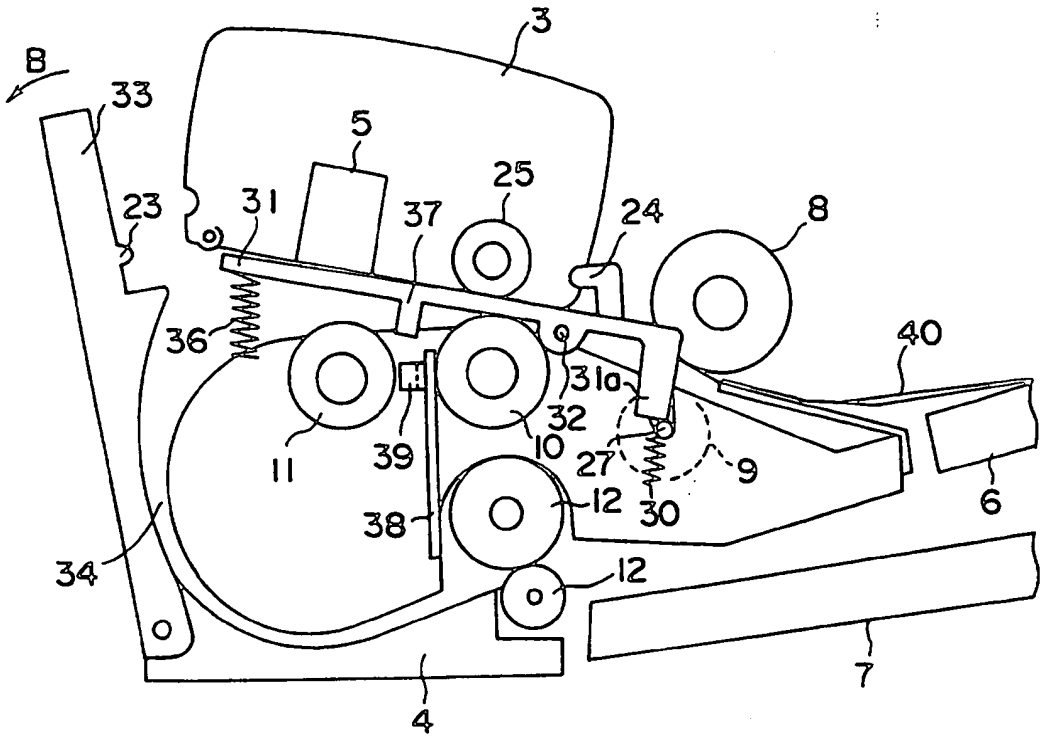

FIG. 7

INTERNATIONAL SEARCH REPORT

International Application No PCT/JP92/00866

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl[5] H04N1/04, G06F15/64

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC	H04N1/00-1/20, G06F15/64, B41J3/24-3/58

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

Jitsuyo Shinan Koho	1926 - 1992
Kokai Jitsuyo Shinan Koho	1971 - 1992

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
A	JP, A, 62-154954 (Toshiba Corp.), July 9, 1987 (09. 07. 87), (Family: none)	1-3
A	JP, A, 63-151170 (Fuji Xerox Co., Ltd.), June 23, 1988 (23. 06. 88), (Family: none)	1-3
A	JP, A, 2-285764 (Ricoh Co., Ltd.), November 26, 1990 (26. 11. 90)	1-3
A	JP, U, 63-102357 (Sanyo Electric Co., Ltd.), July 4, 1988 (04. 07. 88)	1-3

* Special categories of cited documents: [10]

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"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
September 16, 1992 (16. 09. 92)	October 13, 1992 (13. 10. 92)
International Searching Authority	**Signature of Authorized Officer**
Japanese Patent Office	

Form PCT/ISA/210 (second sheet) (January 1985)

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